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मिल — विशिष्टि

(दूसरा पुनरीक्षण)

**End Mills with Parallel
Shank — Specification**

(Second Revision)

ICS 25.100.20

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FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Cutting Tools Sectional Committee had been approved by the Production and General Engineering Divisional Council.

This standard was first published in 1971 and revised in 1991. This revision has been taken up to based on the experience gained in using the standard.

In the preparation of this standard considerable assistance has been derived from ISO 1641-1 : 2003 ‘End mills and slot drills — Part 1 : Milling cutters with cylindrical shanks’, issued by the International Organization for Standardization (ISO).

Following changes have been made in this revision:

- a) Standard series and long series have been incorporated in both flat end and ball end mills,
- b) Type E and Type F have also been included.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off values should be the same as that of the specified value in this standard.

Indian Standard

END MILLS WITH PARALLEL SHANK — SPECIFICATION

(Seconds Revision)

1 SCOPE

This standard specifies the general dimensions and other requirements for the following ‘End mills with ‘Plain parallel shank’, ‘Flattened parallel shank and ‘Threaded shank’.

- a) Flat ended end mills — Standard series and long series, and
- b) Ball nosed end mills — Standard series and long series.

2 REFERENCES

The following standards contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of the standards indicated below.

IS No.	Title
919 (Part 2) : 2014/ ISO 286-2 : 2010	Geometrical Product Specification (GPS) — ISO code system for tolerances on linear sizes — Part 2 : Tables of Standard tolerance classes and limit deviations for holes and shafts (<i>second revision</i>)
1830 : 1982	Technical supply conditions for milling cutters (<i>second revision</i>)
7778 (Part 5) : 2003	Small tools sampling inspection procedures: Part 5 Milling cutters (<i>first revision</i>)
8692 (Part 1) : 2004/ ISO 3338-1 : 1996	Cylindrical shanks for milling cutters: Dimensional characteristic for plain cylindrical shanks (<i>first revision</i>)
(Part 2) : 2013/ ISO 3338-2 : 2007	Dimensional characteristic of flattened cylindrical shanks (<i>second revision</i>)
(Part 3) : 2007/ ISO 3338-3 : 1996	Dimensional characteristic of threaded shanks

3 TYPES

End mills shall be of following types:

Type A — Flat ended end mills with plain parallel shank

Type B — Ball nosed end mills with plain parallel shank

Type C — Flat ended end mills with flattened parallel shank

Type D — Ball nosed end mills with flattened parallel shank

Type E — Flat ended end mills with threaded shank

Type F — Ball nosed end mills with threaded shank

4 TERMINOLOGY

For the purpose of this standard definition given in IS 1830 shall apply.

5 DIMENSIONS

The dimensions for flat ended end mills and ball nosed end mills, standard series and long series shall be as given in Table 1 read with Fig. 1.

6 TOLERANCE ON $-\ell$, L_1 AND L_2

All dimensions in millimetres.

<i>Range of Length</i>		<i>Tolerance on $-\ell$, L_1 and L_2</i>
Over	Upto and Including	
—	6	± 0.5
6	30	± 1.0
30	80	± 1.5
80	180	± 2.0
180	—	± 2.5

7 MATERIAL AND HARDNESS

Material and hardness of end mills shall be according to IS 1830.

8 GENERAL REQUIREMENTS

8.1 Unless otherwise specified, ‘Type A’ end mills of standard series with right hand helical flutes for right hand cutting shall be supplied.

8.2 Unless otherwise specified, Type A, Type C and Type E end mills shall be supplied without centre

cutting design and Type B, Type D and Type F end mills shall be supplied with centre cutting design.

8.3 For the requirements not covered in this standard reference shall be made to IS 1830.

8.4 Dimensions for plain, flattened and screwed shanks shall be according to IS 8692 (Part 1), IS 8692 (Part 2) and IS 8692 (Part 3) respectively.

9 SAMPLING

The sampling and criteria of acceptance shall be according to IS 7778 (Part 5).

10 DESIGNATION

An end mill with plain parallel shank of 'Type A' having diameter $D = 10$ mm of standards series made from high speed steel and tool 'Type 'N' shall be designated as:

End Mill Parallel Shank IS 6353 A 10 N Standard

11 MARKING

11.1 Each end mill shall be marked according to IS 1830.

11.2 BIS Certification Marking

11.2.1 Each end mill may also be marked with the Standard Mark.

11.2.2 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the license for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

12 PRESERVATIVE COATING AND PACKING

Preservative coating and packing of end mills shall be as given in IS 1830.

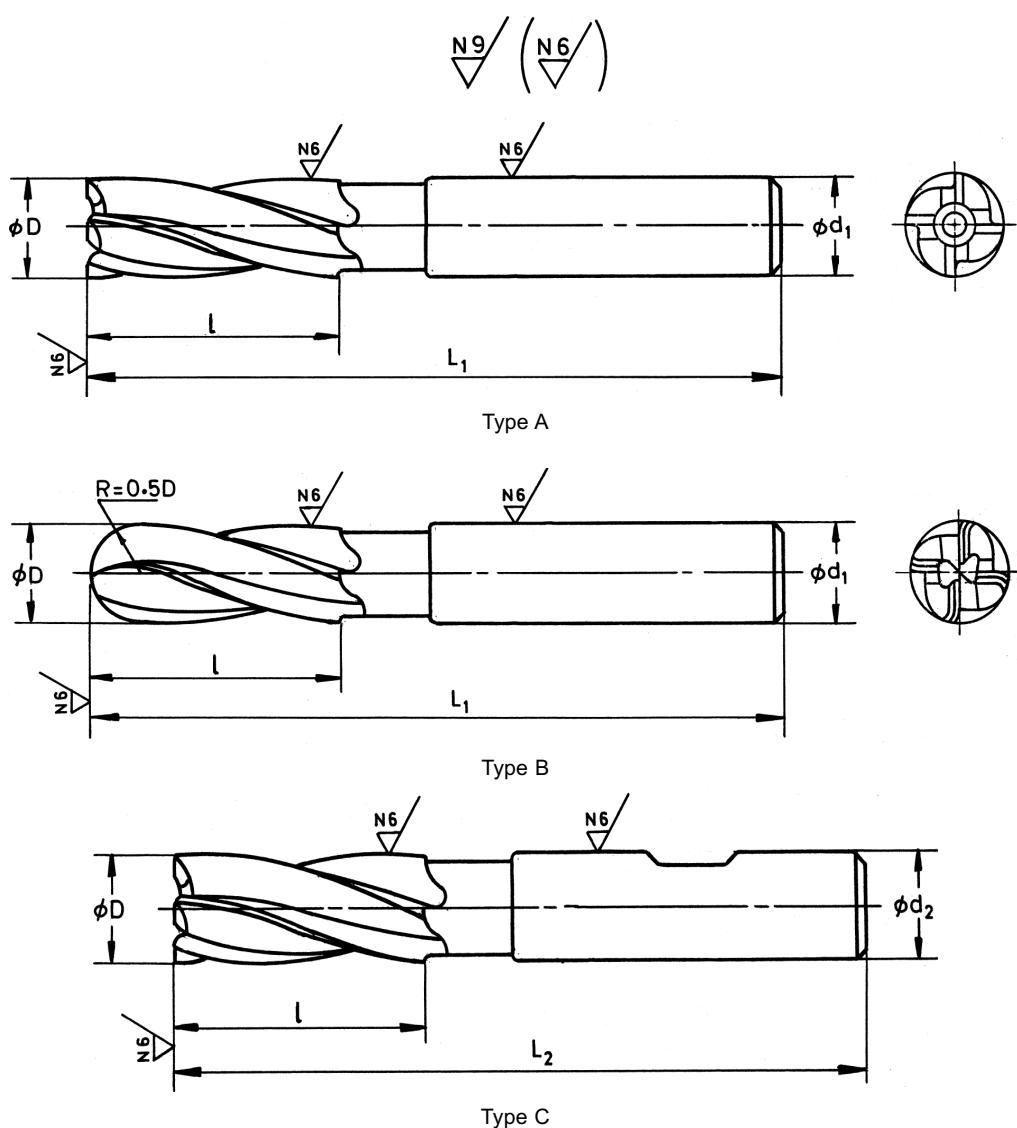
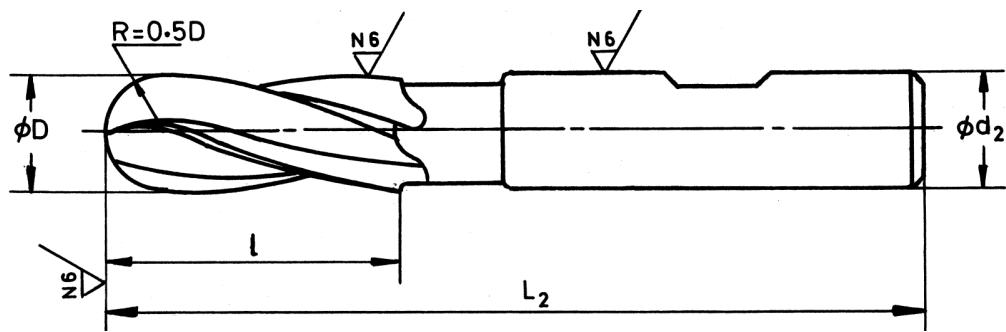
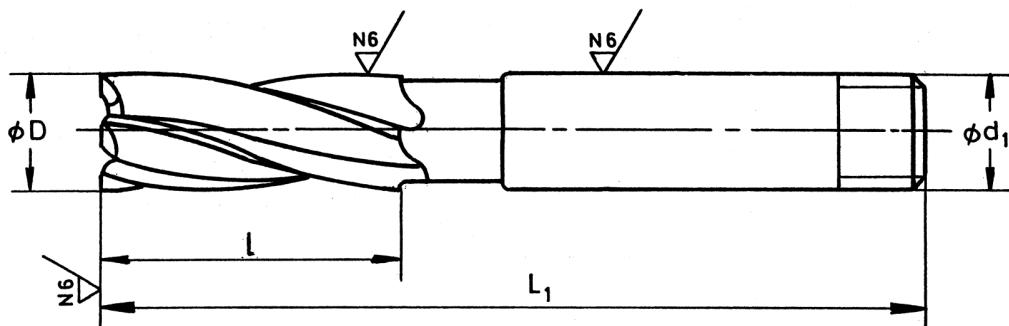


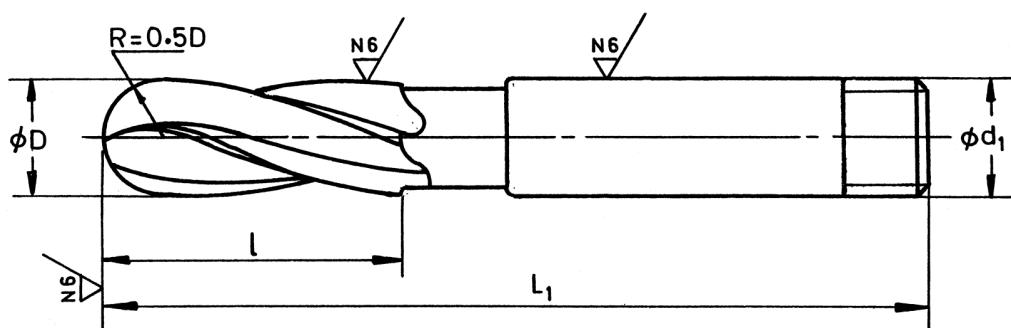
FIG. 1 DIMENSIONS FOR END MILLS WITH PARALLEL SHANKS — (Continued)



Type D



Type E



Type F

FIG. 1 DIMENSIONS FOR END MILLS WITH PARALLEL SHANKS

Table 1 Dimensions for Flat Ended and Ball Nosed End Mills with Parallel Shanks
(Clause 5 and Fig. 1)

All dimensions in millimetres.

Recommended Diameter, D Js14 ¹⁾	Range of Diameters D		Shank Diameter		Length						Tool Type	
					Standard Series			Long Series				
	Over	Up to and Including	d_1 h8 ¹⁾	d_2 h6 ¹⁾	ℓ	L_1	L_2	ℓ	L_1	L_2		
2	1.9	2.36	4	6	7	39	51	10	42	54	N,H,S	
2.5	2.36	3.0	4	6	8	40	52	12	44	56		
3	2.36	3.0	4	6	8	40	52	12	44	56		
3.5	3.0	3.75	4	6	10	42	54	15	47	59		
4	3.75	4.0	4	6	11	43	55	19	51	63		
—	4.0	4.75	5	6	11	45	55	19	53	63		
5	4.75	5.0	5	6	13	47	57	24	58	68		
6	5.0	6.0	6		13	57		24	68			
7	6.0	7.5	8	10	16	60	66	30	74	80		
8	7.5	8.0	8	10	19	63	69	38	82	88		
9	8.0	9.5	10		19	69		38	88			
10	9.5	10.0	10		22	72		45	95			
11	10.0	11.8	12		22	79		45	102			
12	11.8	15.0	12		26	83		53	110			
14	11.8	15.0	12		26	83		53	110			
16	15.0	19.0	16		32	92		63	123			
18	15.0	19.0	16		32	92		63	123			
20	19.0	23.6	20		38	104		75	141			
22	19.0	23.6	20		38	104		75	141			
24	23.6	30.0	25		45	121		90	166			
25	23.6	30.0	25		45	121		90	166			
28	23.6	30.0	25		45	121		90	166			
32	30.0	37.5	32		53	133		106	186			
36	30.0	37.5	32		53	133		106	186			
40	37.5	47.5	40		63	155		125	217			
45	37.5	47.5	40		63	155		125	217			
50	47.5	60.0	50		75	177		150	252			
56	47.5	60.0	50		75	177		150	252			
63	60.0	67.0	50	63	90	192	202	180	282	292		
71	67.0	75.0	63		90	202		180	292			

NOTE — d_1 = Standard shank for plain parallel shank.

d_2 = Standard shank for flattened parallel shank.

¹⁾ See IS 919 (Part 2)

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Catalogue' and 'Standards : Monthly Additions'.

This Indian Standard has been developed from Doc No.: PGD 32 (1265).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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